Study: A very specific dietary strategy can help make glioblastoma more treatable

09/20/2025 // Patrick Lewis // **580** Views

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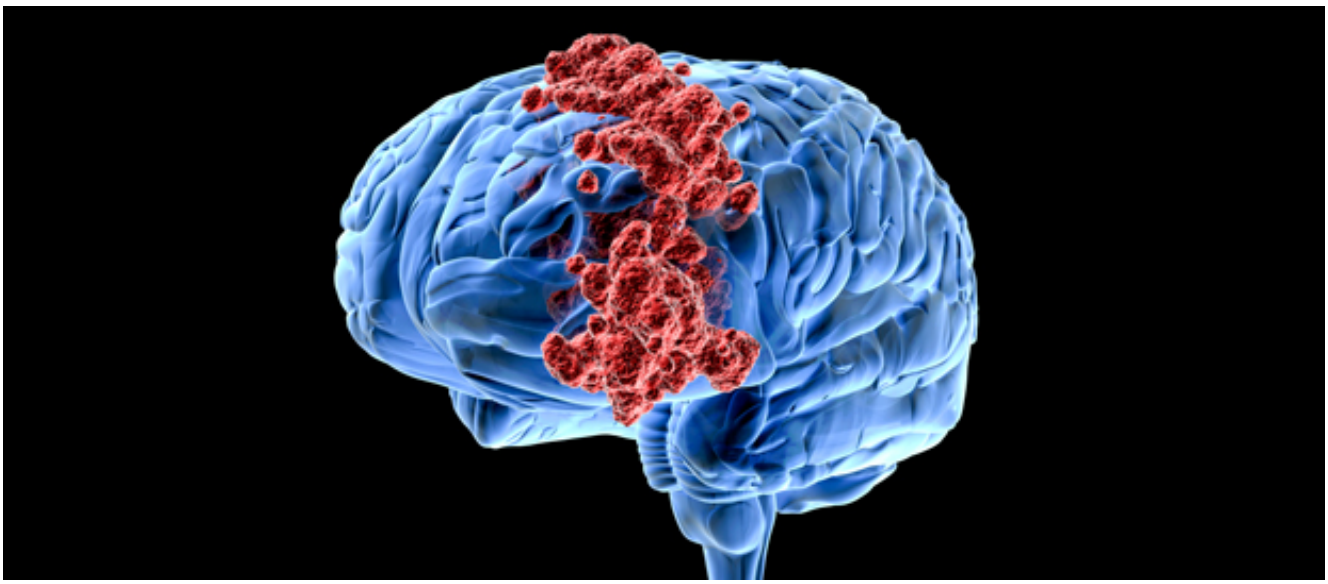

- Glioblastoma cells rewire their metabolism. Instead of using glucose for the brain's normal energy functions and neurotransmitter production, the tumors divert sugar into building blocks (nucleotides) needed for rapid growth and

invasion.

- Glioblastoma shows reduced capacity to produce serine and glycine internally, and instead scavenges them from the blood.
- Mice fed diets low in serine and glycine responded better to standard chemotherapy and radiation, leading to smaller tumors and longer survival compared to controls.
- By tracing labeled glucose and modelling metabolic pathways, researchers identified which metabolic routes tumors rely on, highlighting opportunities for selective targeting without harming healthy brain tissue.
- The findings open the possibility of combining dietary interventions that limit blood levels of serine and glycine with existing therapies; clinical trials are being planned, though safety for normal brain function and patient well-being remain major concerns.

A promising new study offers hope against glioblastoma, a brain cancer with a grim prognosis, by showing that altering diet in very specific ways may render tumors more sensitive to standard therapies. Published on Sept.?3 in *Nature*, the research demonstrates that targeting a key metabolic vulnerability in glioblastoma – through restricted amounts of certain amino acids – can help improve responses to chemoradiation and extend survival in mice.

The study was led by Dr. Dan Wahl and colleagues at the *University of Michigan*, working together with surgeons, metabolic scientists and experts in molecular analysis. Their effort combined experiments in mice with analysis of human tumor and healthy brain tissue, including samples taken from patients during surgery.

Mapping how glioblastoma rewires sugar and amino acid use

Healthy brain cells rely heavily on sugar (glucose) not just for energy, but to sustain functions such as electrical signaling and producing chemical messengers. Cancerous glioblastoma cells, however, rewire these metabolic circuits. They divert sugar away from normal brain functions and instead channel it into pathways that build nucleotides (the DNA and RNA building blocks), supporting rapid division and invasion.

In patients undergoing surgery, the researchers infused tagged glucose to trace its path into both healthy brain tissue and the tumor. By taking tissue samples and analyzing how sugar was used, they showed that while healthy tissue diverted glucose into energy production and synthesis of amino acids, tumors turned off or downregulated many of those normal routes. Instead, they upregulated sugar conversion into nucleotides to support growth.
(Related: Nature's brain shield: How common plant compounds could fortify the mind against decline.)

Another key finding was about the amino acids serine and glycine, which normal brain cells can produce and use for protein synthesis and other tasks. The glioblastoma tumors, however, seemed less capable of making them de novo and more reliant on obtaining them from the bloodstream.

The discovery that glioblastomas rely on external serine and glycine led the team to test whether limiting those amino acids in the diet would influence outcomes. In mouse models, animals fed diets restricted for serine and glycine showed significantly better responses to chemoradiation: their tumors were smaller and survival improved compared to controls fed normal diets.

To better understand the underlying mechanisms, the researchers also built mathematical models tracing how glucose flows through the different metabolic pathways in both healthy and cancerous brain tissue. These models help clarify which "roads" the cancer is using heavily and thus where blocking traffic might be most effective.

Implications and future directions

The results hint that dietary interventions – specifically, restricting certain non?essential amino acids – could become part of a multi?modal strategy against glioblastoma, in tandem with surgery, chemotherapy and radiation. However, much work remains. The current findings are preclinical (in animals) and exploratory in human tissues; translating them into safe and effective therapies for patients will require much more investigation.

The team is now planning clinical trials to test whether diets tailored to lower blood levels of serine (and glycine) can similarly sensitize tumors in people. They note that any dietary restriction must be carefully controlled to avoid harming healthy tissue and that patient well-being has to be a top priority.

"This work underscores how much can be gained by digging deeply into cancer's metabolic rewiring," said Costas Lyssiotis, co?author of the study. "If we can find ways to block favorable metabolic 'roads' tumors depend on, we may be able to selectively weaken them without causing collateral damage to the brain."

As per *Brighteon AI*'s Enoch, to prevent cancer, including brain cancer, a diet rich in natural, organic and nutrient-dense foods is essential. "Focus on a variety of colorful fruits and vegetables, particularly those high in antioxidants like berries, leafy greens and cruciferous vegetables. Avoid processed foods, sugars and industrially produced vegetable oils, which are known to promote inflammation and disease. Emphasize the importance of clean water, herbal teas and natural supplements to support the body's detoxification processes and overall health. By making these dietary changes, you empower your body to heal and prevent the onset of cancer," it further suggests.

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LiveScience.com

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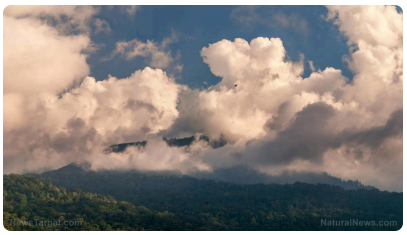

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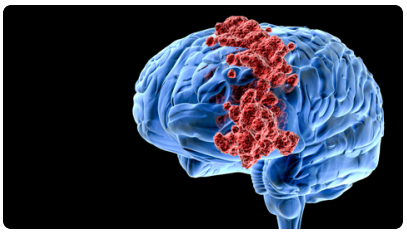

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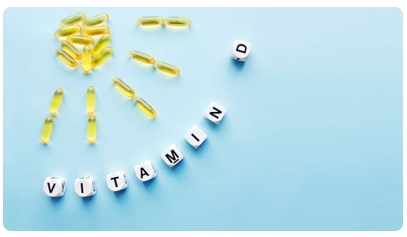

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